Clackamas County Service District #1
Clackamas County, Oregon
Cooperating Technical Partners
Mapping Activity Statement

Mapping Activity Statement No. 1 – Digital Flood Insurance Rate Map (DFIRM) Production and Development of Updated Flood Hazard Data

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated August 29. 2002, between Clackamas County Service District #1 (CCSD #1) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement No.1 is as follows:

1. Objective and Scope:

The objective of this Flood Map Project for Rock Creek and Richardson Creek is to develop a new or updated Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for Clackamas County, Oregon. The DFIRM and FIS report shall be produced in the FEMA community-based format.

Additionally, this Flood Map Project shall include developing new and/or updated flood hazard data for the flooding sources listed in the following table. These data will be developed using detailed-study methods.

Flooding Source	Reach Limits	Reach Length (Miles)
Rock Creek	From Confluence with Clackamas River at Mile 6.5 Upstream to Upstream Face of Tillstrom Road	5.3
Rock Creek Tributary A	From Confluence with Rock Creek at Mile 3.10 Upstream to Upstream Face of Tillstrom Road	1.7
Rock Creek Tributary B	From Confluence with Rock Creek at Mile 2.55 Upstream to Upstream Face of 162nd Avenue	0.5
Rock Creek Tributary C	From Confluence with Rock Creek at Mile 2.34 Upstream to Upstream Face of 162nd Avenue	0.4
Rock Creek Tributary D	From Confluence with Rock Creek at Mile 1.53 Upstream Toward 72nd Avenue	0.5
Rock Creek Tributary E	From Confluence with Rock Creek at Mile 0.19 Upstream to Upstream Face of Goose Hollow Drive	0.6
Richardson Creek	From Confluence with Clackamas River at Mile 9.4 Upstream to Approximately 0.4 Mile Upstream of Royer Road	3.0
Richardson Creek Tributary A	From Confluence with Richardson Creek at Mile 2.16 Upstream to Royer Road	0.4
Richardson Creek Tributary B	From Confluence with Richardson Creek at Mile 1.59 Upstream to Upstream Face of Sunnyside Road	1.1
Richardson Creek Tributary C	From Confluence with Richardson Creek at Mile 0.81 Upstream to Upstream Face of Keller Road	0.6

This Flood Map Project shall be completed by the following Mapping Partners:

- CCSD #1;
- Pacific Water Resources, Inc. (PWR), a contractor to CCSD#1;
- Michael Baker Jr., Inc., the FEMA Flood Map Production Coordination Contractor (MCC); and
- Davis Group (DG), a subcontractor to PWR..

The activities for this Flood Map Project, including required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized in the table below. In the table below, CCSD #1

is identified as "CTP." All activities that are to be accomplished by CCSD #1 or contractors to CCSD #1, including those that may be selected after the project startup, are included in the "CTP" column. This Flood Map Project is not being completed as part of a separate FEMA-contracted flood study; therefore, FEMA has not assigned any mapping activities to a FEMA Study Contractor (SC).

The sections of this Mapping Activity Statement that follow describe the specific mapping activities associated with this Flood Map Project. Each activity description identifies the scope of the activity, responsible Mapping Partner(s), FEMA standards that must be met, and resultant product(s).

Activity	CTP	MCC	SC
Activity 1 – Field Surveys and Reconnaissance	X		
Activity 2 – Topographic Data Development	X		
Activity 3 – Independent QA/QC Review of Topographic Data		X	
Activity 4 – Hydrologic Analyses	X		
Activity 5– Independent QA/QC Review of Hydrologic Analyses		X	
Activity 6 – Hydraulic Analyses	X		
Activity 7 – Independent QA/QC Review of Hydraulic Analyses		X	
Activity 8 – Floodplain Mapping (Detailed Riverine Analysis)	X		
Activity 9 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)		X	
Activity 10 – Base Map Acquisition and Preparation	X		
Activity 11 – DFIRM Production (Non-Revised Areas)		X	
Activity 12 – DFIRM Production (Merging Effective and Revised Information)		X	
Activity 12A – Application of DFIRM Graphic and Database Specifications		X	
Activity 12B – Independent QA/QC Review of Final DFIRM		X	
Activity 13 – Preliminary DFIRM and FIS Report Distribution		X	
Activity 14 – Post-Preliminary Processing	X	X	

Activity 1 - Field Surveys and Reconnaissance

Responsible Mapping Partners: CCSD #1 and PWR

Scope: To supplement any field reconnaissance conducted during the scoping phase of this Flood Map Project, PWR shall conduct a detailed field reconnaissance of the specified study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance status of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses. In addition to the initial field reconnaissance, this activity includes conducting field surveys, including obtaining channel and floodplain cross sections, identifying or establishing temporary bench marks (TBMs), and obtaining the physical dimensions of hydraulic and flood-control structures. PWR is responsible for coordinating with other team members collecting topographic data under Activity 2.

Activity 1 includes obtaining startup data needed to drive the remaining modeling tasks. PWR shall perform all field reconnaissance and re-visit all crossing structures and shall perform ground surveys for the hydraulic modeling.

Survey Cross Sections. DG shall survey stream sections from bank to bank, such that PWR can tie those points in with pre-existing aerial contour mapping to develop hydraulic model sections that span the 500-year floodplain.

*Survey Structures***.** DG shall survey road centerlines and the stream channel at the upstream side of the crossing, and shall survey culvert IE's at the inlet and outlet or bridge corners and pier centerlines at bridges. At each structure, a point shall be identified suitable for use as an Elevation Reference Mark (ERM). Field notes shall document bridge corners, ERM locations, control point layout, and the inlet size, type, and material of culverts.

*Survey Aerial Check Points***.** DG shall survey four coordinate points at agreed upon and well-defined locations such that PWR can quantify the positional and elevation accuracy of the aerial contour mapping provided by CCSD #1.

*Document Temporary Bench Mark Locations***.** DG shall tabulate Temporary Bench Mark numbers and location descriptions from the surveyed stream crossing structures suitable for incorporating into the work maps and the DFIRM and DFIRM database as appropriate.

*Locate and Measure Structures***.** PWR shall identify and visit all bridges and culverts crossing the streams to be studied. PWR shall measure hydraulic dimensions for all bridges, including deck dimensions and pier characteristics needed for hydraulic modeling. Culvert inlet types, materials, and sizes shall be obtained from the XP-SWMM model and field checked now, with more documentation as part of the ground survey (Task 3). These data shall be used together with the needed ground surveys of road centerlines, approach stream channels, bridge corner elevations, and culvert inverts to complete the hydraulic models.

Locate Sections for Ground Survey. PWR and DG shall identify and locate the proposed valley and structure cross sections whose elevation shall be determined by field survey crews.

Products: In accordance with the Technical Support Data Notebook (TSDN) format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, PWR shall make the following products available to FEMA:

- Digital ASCII survey point file in CSV format;
- Paper copy of survey field notes;
- Digital summary of aerial check point elevations;
- Digital table of ERM elevation and location descriptions;
- Copies of any photos taken during survey;
- Geographic Information System (GIS) base map coverages;
- Notebook with structure sketches;
- CD-ROM with digital field reconnaissance photos and scanned sketches; and
- GIS index map of field reconnaissance.

Appendix M may be downloaded from the FEMA Web site at http://www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 2 - Topographic Data Development

Responsible Mapping Partners: CCSD #1 and PWR

Scope: To supplement the field surveys conducted under Activity 1, additional topographic data of the overbank areas of flooding sources shall be obtained to delineate floodplain boundaries. Specifically, new topographic data shall be generated for the Rock and Richardson Creek watersheds using aerial photogrammetric 2-foot contour mapping previously produced for CCSD #1. PWR shall coordinate with other team members conducting field surveys under Activity 1. Contour interval and/or accuracy for the topographic data shall be selected based on FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Activity 2 also consists of developing topographic maps and/or Digital Elevation Models (DEMs) for the subject flooding sources using the data collected under Activity 1. Unless directed to do otherwise by FEMA, all new topographic data must be developed and submitted in digital format. Upon completion of topographic data collection and processing for the Rock and Richardson Creek watersheds, PWR shall submit these data to MCC for an independent QA/QC review under Activity 3. Data for the remaining flooding sources shall be submitted for an independent QA/QC review at the completion of Activity 2. PWR shall address all concerns or questions regarding Activity 2 raised during the QA/QC review outlined in Activity 3.

Standards: All work under Activity 1 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, PWR shall make the following products available to FEMA:

- Digital and hardcopy topographic maps showing 2-foot contours with spot elevations as available in AutoCAD Version 2000 DWG format (used in GIS to cut model sections and to draw floodplain boundaries).;
- Completed Form No. 5 of *Revisions to National Flood Insurance Program Maps, Application/Certification Forms and Instructions* (MT-2), which is available from the FEMA website at www.fema.gov/mit/tsd/dl_mt-2.htm;
- Report summarizing methodology and results;
- Mass points and breaklines data on CD-ROM;
- Digital work map with contours;
- Checkpoint analyses to assess the accuracy of data including Root Mean Square Error (RMSE) calculations to support vertical accuracy;
- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey (NGS) data sheets for Network Control Points (NCPs) used to control remote sensing and ground surveys; and
- Metadata compliant with Federal Geographic Data Committee standards.

Activity 3 - Independent QA/QC Review of Topographic Data

Responsible Mapping Partner: MCC

Scope: MCC shall review the mapping data generated by PWR under Activity 2 to ensure that these data are consistent with FEMA standards as well as standard engineering practice and are sufficient to prepare or revise the DFIRM.

Standards: All work under Activity 3 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, MCC shall make the following products available to FEMA.

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that arise as a result of the independent QA/QC review.

Activity 4 – Hydrologic Analyses

Responsible Mapping Partners: CCSD #1 and PWR

Scope: Hydrologic analyses shall be completed for approximately 14.5 square miles of drainage area for the Rock Creek and Richardson Creek watersheds (draining to the flooding source(s) specified in Section 1 of this Mapping Activity Statement). The hydrologic methods used for these analyses shall be to use the DHI MIKE-11 Rainfall/Runoff (R/R) hydrology model with the Urban Hydrology Method (UHM). Inputs shall be based on automated GIS processing of impervious area, land use cover, and slope to establish travel time and infiltration parameters for runoff. Surveyed hydraulic sections shall be used for in-stream hydrodynamic routing.

The 24-hour Natural Resources Conservation Service 1A design storm shall be used along with 24-hour rainfall depths established for this area by published rainfall distributions that shall be checked against locally observed rainfall for reasonableness. Peak flood discharges shall be calculated for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events. These flood discharges shall be the basis for subsequent hydraulic analyses of the subject flooding source(s). In addition, PWR shall be responsible for addressing all concerns or questions regarding Activity 4 raised during the independent QA/QC review outlined in Activity 5.

Data shall be provided in both tabular and GIS format, with the flows linked to their respective stream reach. The resulting flows shall be submitted to FEMA for review and approval, and shall be incorporated when approved into the final flood profile models before beginning the floodway modeling.

Establish Design Rainfall Events. Hourly rainfall data available for the Proctor Road and Pleasant Valley School stations and provided to PWR in electronic format shall be analyzed to determine their approximate intensity, duration and frequency relationships. This information shall be compared to rainfall depths available from the existing National Oceanic and Atmospheric Administration Atlas to determine if modification to this atlas data throughout the Rock and Richardson Creek watersheds is warranted. PWR shall establish the appropriate rainfall depths and distribution to use in the simulation of 10-, 2-, 1-, and 0.2-percent-annual-chance design flood events for the Rock and Richardson Creek watersheds.

Document Floodflows. PWR shall document these flows and submit them to FEMA for review and approval.

Create GIS Hydrologic Data. PWR shall use XP-SWMM routing tables plus detailed contour mapping to create or update stream centerline coverages and provide a set of GIS map layers including subbasin polygons, stream centerlines, and combination/junction points, all attributed with appropriate flows, drainage area and other relevant parameters. Existing-conditions hydrology shall be derived from aerial photography. Future-conditions hydrology shall be based on built-out conditions for the "Employment Centers" land-use scenario described in the June 30, 2001 *Damascus Concept Planning Study* prepared by Clackamas County. Areas not described in this planning study shall be analyzed at built-out conditions under current zoning, including those areas recently annexed and rezoned by the City of Happy Valley.

Standards: All work under Activity 4 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: Upon completion of hydrologic modeling for Rock and Richardson Creek watersheds, PWR shall submit the results to MCC for an independent QA/QC review as described in Activity 5. PWR shall submit the results for the remaining flooding sources for an independent QA/QC review at the completion of Activity 4.

In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, PWR shall make the following products available to FEMA:

- Memorandum on hydrology;

- Digital and hardcopy versions of all hydrologic modeling files for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods;
- Digital and hardcopy versions of of Summary of Discharges Table presenting discharge data for each flooding source;
- Digital and hardcopy versions of of draft text for Section 3.1, Hydrologic Analyses, of FIS report;
- Signed copy of appropriate certification form for hydrology;
- Digital and hardcopy versions of all backup data used in the analysis, including work maps
- GIS map of stream centerlines and junctions with attributed floodflows, and;
- All GIS input and output data, intermediate data processing products, GIS data layers, and final products used for GIS processing.

Activity 5 - Independent QA/QC Review of Hydrologic Analyses

Responsible Mapping Partner: MCC

Scope: MCC shall review the technical, scientific, and other information submitted by PWR under Activity 4 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to revise the DFIRM. This work shall include, at a minimum, the activities listed below

- Review submittal for technical and regulatory adequacy, completeness of required information, application/certification forms, and supporting data and documentation. The technical review shall focus on the following:
  - Use of acceptable models;
  - Use of appropriate methodology(ies);
  - Correctly applied methodology(ies)/model(s), including QC of input parameters;
  - Comparison with gage data and/or regression equations, if appropriate; and
  - Comparison with discharges for contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydrologic modeling review. All supporting data should be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.

Standards: All work under Activity 5 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that arise as a result of the QA/QC review.

Activity 6 – Hydraulic Analyses

Responsible Mapping Partners: CCSD #1 and PWR

Scope: PWR shall perform hydraulic analyses for approximately 14.1 miles of the flooding sources specified in Section 1 of this Mapping Activity Statement. The modeling shall include the 10-, 2-, 1- and 0.2-percent-annual-chance storm events based on peak discharges computed under Activity 4. The hydraulic methods used for this analysis shall include use of the U.S. Army Corps of Engineers HEC-RAS version 3.0 hydraulic model in steady-state mode for all study reaches.

PWR shall use cross-section and field survey data collected under Activity 1 to perform the hydraulic analyses. The hydraulic analyses shall be used to establish flood elevations and regulatory floodways for the subject flooding sources. PWR shall use the FEMA CHECK-RAS checking program to check the reasonableness of hydraulic analyses. To facilitate the independent QA/QC review under Activity 7, PWR shall provide an explanation for each unresolved message from the CHECK-RAS program, as appropriate. In addition, PWR shall address all concerns or questions regarding Activity 6 raised during the independent QA/QC review under Activity 7.

The modeling approach shall make extensive use of pre- and post-processing tools to speed the model input assembly. However, the basic FEMA-approved model (HEC-RAS 3.0 as noted above) shall be used without change to perform the actual hydraulic modeling work.

Activity 6 also involves the creation of the hydraulic model in HEC-RAS for existing and future conditions and the use of the model to develop Flood Profiles for each of the seven flood events under the two conditions (14 total profiles). The Flood Profiles shall be tabulated and graphed and selected floodplain boundaries shall be mapped on GIS layers. The floodflows accepted by FEMA shall be used to finalize the draft models, and the profiles and floodplain boundaries shall be submitted to FEMA for review and acceptance prior to beginning the floodway modeling. The model products from this task shall be considered "draft" until the floodway modeling is completed.

*Create Hydraulic Model***.** PWR shall create an HEC-RAS 3.0 hydraulic model using special, in-house tools to process the ground surface Triangulated Irregular Network (TIN) and the additional ground survey data into RAS input geometry. PWR shall endeavor to reuse as much data as possible from the XP-SWMM model, but anticipates that little data shall be appropriate for inclusion in the FEMA-quality FIS model.

*Model Flood Profiles***.** PWR shall run the models for existing- and future-conditions flows, shall tabulate and graph in FEMA format the resulting the existing-conditions 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations and either the future-conditions 1-percent-annual-chance or future conditions 0.2-percent-annual-chance flood elevations for submittal, and shall also graph all design flows for existing and future conditions for use within Clackamas County.

*Check Modeling Output***.** PWR shall run the FEMA CHECK-RAS for all reaches modeled and document explanations of significant messages in spreadsheet format.

Standards: All work under Activity 6 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: Upon completion of hydraulic modeling for Rock Creek and Richardson Creek, PWR shall submit the results to MCC for an independent QA/QC review as described in Activity 7. PWR shall submit the results for all flooding sources for Rock Creek and Richardson Creek for an independent QA/QC review at the completion of Activity 6.

In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, PWR shall make the following products available to FEMA:

- HEC-RAS 3.0 hydraulic model for the above design flood profiles;
- CHECK-RAS output message with PWR responses as appropriate;
- Digital and hardcopy versions of Flood Profiles for the existing-conditions 10-, 2-, 1- and 0.2-percent-annual-chance water-surface elevations and future-conditions 1-percent-annual-chance water-surface elevations using FEMA's RASPLOT program or similar software;
- Digital and hardcopy versions of Floodway Data Table for each subject flooding source that is compatible with the DFIRM database;
- Digital and hardcopy versions of all hydraulic modeling (input and output) files;
- Digital and hardcopy versions of table with range of Manning's "n" values;

- An explanation for each unresolved message from CHECK-2 or CHECK-RAS program, as appropriate;
- Digital and hardcopy versions of all backup data used in the analyses;
- Digital and hardcopy versions of draft text for inclusion in Section 3.2, Hydraulic Analyses, of FIS report; and
- All relevant input and output data, intermediate data processing products, GIS data layers, and final products associated with the GIS pre- and post-processing of the modeling work.

Activity 7 - Independent QA/QC Review of Hydraulic Analyses

Responsible Mapping Partner: MCC

Scope: The MCC shall review the technical, scientific, and other information submitted by PWR under Activity 6 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to revise the DFIRM. This independent QA/QC review of the hydraulic analyses shall include, at a minimum, the activities listed below.

- Review submittal for technical and regulatory adequacy, completeness of required information, application/certification forms, and supporting data and documentation. The technical review shall focus on the following:
  - Use of acceptable models;
  - Starting water-surface elevations;
  - Cross section geometry;
  - Manning's "n" values and expansion/contraction coefficients;
  - Bridge and culvert modeling;
  - Discharges;
  - Regulatory floodway computation methods; and
  - Tie-in to upstream and downstream non-revised profiles.
- Use the CHECK-2 (when HEC-2 model was used) or CHECK-RAS (when HEC-RAS model was used) programs to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 7 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that arise as a result of the independent QA/QC review.

Activity 8 – Floodplain Mapping (Detailed Riverine Analysis)

Responsible Mapping Partners: CCSD #1 and PWR

Scope: PWR shall delineate digital floodplain and regulatory floodway boundaries for the flooding sources specified in Section 1 of this Mapping Activity Statement. The mapping shall incorporate all revised hydraulic modeling and newly acquired topographic data. PWR shall delineate the existing-conditions 1- and 0.2-percent-annual-chance

floodplain boundaries, future-conditions 1-percent-annual-chance floodplain boundaries, and the regulatory floodway boundaries on a digital work map based on existing topographic mapping or topographic data/mapping developed under Activity 2, which shall be the basis of the revised DFIRM. PWR shall provide an explanation for selecting existing topographic mapping if used for the floodplain boundary delineations. PWR shall incorporate the results of all effective Letters of Map Change as appropriate. In addition, PWR shall address all concerns or questions regarding Activity 8 raised during the independent QA/QC review outlined in Activity 9.

*Map Cross Sections***.** PWR shall map the cross section locations as a GIS line cover and attribute with appropriate data such as flow and profile elevation. Covers shall be submitted for CCSD #1 review and finalized when regulatory floodways are completed.

*Map Floodplain Boundaries***.** PWR shall map the existing-conditions 1- and 0.2-percent-annual-chance floodplain boundaries and the future-conditions 1-percent-annual-chance floodplain boundaries using automated mapping tools and shall develop GIS polygon coverages of for each. Floodplain widths shall be consistent with modeled widths at each RAS cross section, as required by FEMA. Boundaries shall be polygons and shall be appropriately attributed for use within CCSD #1 and for use in developing work maps and regulatory floodways. Covers shall be submitted for CCSD #1 review and finalized when regulatory floodways are completed.

Standards: All work under Activity 8 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: Upon completion of floodplain mapping for Rock Creek and Richardson Creek, PWR shall submit the results to MCC for an independent QA/QC review under Activity 9. PWR shall submit the mapping for the remaining flooding sources for an independent QA/QC review at the completion of Activity 8.

In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, PWR shall make the following products available to FEMA:

- Digital work maps showing existing-conditions 1- and 0.2-percent-annual-chance floodplain boundary delineations and/or future-conditions 1-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, Base Flood Elevations (BFEs), flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, in one of the FEMA-approved GIS file and database formats as discussed in *Guidelines and Specifications for Flood Hazard Mapping Partners*
- Metadata files describing the DFIRM data, including the required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners;*
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM; and
- Any backup or supplemental information used in the mapping required for the independent QA/QC review outlined in Activity 9.

Activity 9 - Independent QA/QC Review of Floodplain Mapping (Revised Areas)

Responsible Mapping Partner: MCC

Scope: MCC shall review the floodplain mapping submitted by PWR under Activity 8 to ensure that the results of the hydraulic analyses are accurately represented on the work maps. This work shall include, at a minimum, the following activities:

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs shown on the work map for proper location and agreement with the results of the hydraulic modeling.

- Review the regulatory floodway widths for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Review the floodplain widths at cross section as shown on work maps to ensure they match the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure they match the Flood Profiles
- Review the DFIRM mapping files to ensure they were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Review the metadata files to ensure they include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 9 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- A Summary Report that describes the findings of the independent QA/QC review noting any deficiencies and providing recommendations to resolve them or agreeing with the mapping results; and
- An annotated work map with all questions and/or concerns indicated if necessary.

Activity 10 - Base Map Acquisition and Preparation

Responsible Mapping Partners: CCSD #1 and PWR

Scope: Activity 10 consists of acquiring and preparing the digital base map for the project. PWR shall do the following:

- Obtain digital files (raster or vector) of the base map. USGS DOQQ's shall be used as default for Clackamas County, Oregon, and supplemented with higher-quality digital imagery within the local urban area including the Rock and Richardson Creek watersheds). CCSD # 1 shall purchase the imagery as necessary.
- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge. Note – not necessary when using USGS DOQQ's;
- Certify that the digital data meet the minimum standards and specifications that FEMA requires for DFIRM production; and
- Populate the DFIRM database for base map features and applicable data (e.g. Jurisdiction Boundaries and Hydrographic Features).

Standards: All work under Activity 10 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CCSD#1 and/or PWR shall make the following products available to FEMA:

- Written certification that the digital data meet the minimum FEMA standards and specifications; and
- Documentation that FEMA can use the digital base map.

Activity 11 - DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: MCC

Scope: For all flooding sources except those specified in Section 1 of this Mapping Activity Statement that shall have updated flood hazard data developed under Activities 1 through 9, the MCC shall convert the affected effective Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) panels to digital format in conformance with FEMA DFIRM specifications as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*. The MCC shall use the base map acquired under Activity 10 for the conversion.

Activity 11 covers the digitization of 33 FIRM panels and 29 FBFM panels for Clackamas County. For these FIRM and FBFM panels, the MCC also shall incorporate Letters of Map Change issued by FEMA since the current effective FIRM panels for each affected community became effective. MCC shall not digitize the digital flood theme for the flooding sources specified in Section 1 of this Mapping Activity Statement as part of Activity 11. MCC shall leave these as "holes" in the digital flood theme that shall be filled in under Activity 11A using digital flood data developed under Activity 8.

Standards: All work under Activity 11 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of the DFIRM panels showing all unrevised flood hazard information taken from the effective FIRMs and FBFMs at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM, including a check that the road and floodplain relationship is maintained for all unrevised areas.

Activity 12 – DFIRM Production (Merge of Revised and Non-Revised Information)

Responsible Mapping Partner: MCC

Scope: Upon completion of the Floodplain Mapping activity for the revised flooding sources (Activities 8, 8A, and/or 8B) and the DFIRM Production activity for non-revised flooding sources (Activity 11), MCC shall merge the digital floodplain data into a single updated DFIRM. This work shall include tie-ins of flood hazard information with contiguous communities that were not studied as part of this project. Also, the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries shall be tied in. MCC shall coordinate with the Mapping Partners responsible for Activity 8, 8A, and/or 8B and Activity 11 as necessary, to resolve any potential tie-in issues.

Standards: All work under Activity 12 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, MCC shall make the following products available to FEMA.

- Digital work maps showing 1- and 0.2-percent-annual-chance floodplain boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features shown;

- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners* provided on CD-ROM;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners* provided on CD-ROM;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

Activity 12A – Application of DFIRM Graphic and Database Specifications

Responsible Mapping Partner: MCC

Scope: Upon completion of merge of effective and revised floodplain mapping into a single updated DFIRM (Activity 12), the MCC shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM mapping files. This work shall include adding all required annotation, line patterns, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user).

Standards: All work under Activity 12A shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA.

- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- DFIRM database files in one of the database formats specified in FEMA's DFIRM Specifications, provided on CD-ROM;
- Complete set of plots of the DFIRM panels showing all details at the agreed-upon scale(s); and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

Activity 13 – Preliminary DFIRM and FIS Report Distribution

Responsible Mapping Partner: MCC

Scope: Activity 13 consists of the preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community and public review and comment. The activities to be performed are summarized below.

FIS Report Preparation: The MCC shall prepare an FIS report in the Countywide Format required by FEMA.

Final QA/QC Review of Preliminary DFIRM and FIS Report: The MCC shall perform a final QA/QC review of the Preliminary DFIRM and FIS report, including all data tables, Flood Profiles, and other components of the FIS report and the news release discussed below. The QA/QC review procedures shall be consistent with the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Discrepancy Resolution: The MCC shall work with CCSD#1, PWR, and FEMA to resolve discrepancies identified during the final QA/QC review.

Distribution of Preliminary DFIRM and FIS Report: The MCC shall distribute the Preliminary copies of the DFIRM and FIS report to community and county officials, State agencies, and others as deemed appropriate by FEMA.

News Release Preparation: The MCC shall prepare news release notifications of BFE changes, perform a QA/QC review for accuracy and compliance with FEMA format requirements, and submit them to FEMA for review.

Summary of Map Actions (SOMA) Preparation: The MCC shall prepare a Preliminary SOMA for each affected community as appropriate, listing the Letters of Map Change that will be affected by the DFIRM.

Standards: All work under Activity 13 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MCC shall make the following products available to FEMA:

- Preliminary transmittal letters shall be prepared. These letters and any additional letters requested by FEMA shall be prepared in accordance with the current version of the FEMA *Document Control Procedures Manual.*
- Preliminary copies of the DFIRM and FIS report, including all updated data tables and Flood Profiles shall be mailed to the CEO and floodplain administrator of each community, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.
- A Preliminary SOMA, prepared in accordance with FEMA requirements, shall be provided if appropriate.
- Revised DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- Revised DFIRM database files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- Revised metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

Activity 14 - Post-Preliminary Processing

Responsible Mapping Partner: MCC

Scope: Activity 12A consists of finalizing the DFIRM and FIS report after FEMA has distributed the Preliminary DFIRM and FIS report for public review and comment. The activities to be performed are summarized below.

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the community, the MCC shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*:

- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators as appropriate.
- News releases are published in prominent newspapers with local circulation.
- Notices are published in the *Federal Register*.

Resolution of Appeals and Protests: CCSD #1 and MCC shall support FEMA in reviewing and resolving appeals and protests received during the 90-day appeal period. For each appeal and protest, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of the submittal;
- Technical review of the submittal;
- Preparation of letters requesting additional supporting data;
- Performance of revised analyses; and
- Preparation of draft resolution letter and revised DFIRM and FIS report material for FEMA review.

The MCC shall mail all associated correspondence upon authorization by FEMA.

Preparation of Special Correspondence: The CCSD #1 and MCC shall support FEMA in responding to comments not received within the 90-day appeal period (referred to as "special correspondence"), including drafting responses for FEMA review when appropriate and finalizing responses when requested by FEMA. The MCC also shall mail the final correspondence (and enclosures if appropriate) and distribute appropriate copies of the correspondence and enclosures upon receipt of authorization from FEMA.

Revision of FIRM and FIS Report: If necessary, MCC shall work together with and CCSD #1 to revise the DFIRM and FIS report at the direction of the FEMA Regional Project Officer and distribute Revised Preliminary copies of the DFIRM and FIS report.

Final SOMA Preparation: The MCC shall prepare a Final SOMA for each affected community as appropriate.

Processing of Letter of Final Determination: The MCC shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare a Letter of Final Determination for FEMA review in accordance with the FEMA *Document Control Procedures Manual*. The MCC also shall mail the final signed correspondence and enclosures and distribute appropriate copies of the Letter of Determination and enclosures upon receipt of authorization from FEMA.

Processing of Final DFIRM and FIS Report for Printing: The MCC shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to the FEMA Map Service Center for printing by the U.S. Government Printing Office. The MCC also shall prepare the appropriate paperwork to accompany the DFIRM and FIS report, including the transmittal letters to the community CEOs, the Print Processing Worksheets, the Printing Requisition Form, and the Community Map Actions Forms.

Revalidation Letter Processing. The MCC shall prepare and distribute a letter to the community CEO and floodplain administrator to notify the community about Letters of Map Change for which determinations will remain in effect after the DFIRM and FIS report become effective.

Archiving Data: The MCC shall ensure the engineering backup data and related correspondence are packaged and stored properly in the library archives until they are transmitted to the FEMA Engineering Study Data Package Facility.

Standards: All work under Activity 14 shall be performed in accordance with the standards specified in Section 5 of this Mapping Activity Statement.

Products: In accordance with *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*, the MCC shall make the following products available to FEMA:

- Documentation that the news release was published in accordance with FEMA requirements;
- Documentation that the appropriate *Federal Register* notices (Proposed and Final Rules) were published in accordance with FEMA requirements;
- Draft and final Letter of Final Determination (and all associated backup data and information) for FEMA review and signature as appropriate;
- Final SOMA, as appropriate;
- Draft and final Special Correspondence (and all associated backup data and information) for FEMA review and signature as appropriate;
- Draft and final Appeal and Protest resolution letters (and all associated backup data and information) for FEMA review and signature as appropriate;
- DFIRM negatives and final FIS report materials, including all updated data tables and Flood Profiles;
- Paperwork for the final DFIRM and FIS report materials;
- Letter of Map Change Revalidation Letter(s), if required; and
- Complete, organized Engineering Study Data Package.

2. Technical and Administrative Support Data Submittal:

The Project Team members for this Flood Map Project that have responsibilities for activities included in this Mapping Activity Statement shall comply with the data submittal requirements summarized below.

- All supporting documentation for the activities in this Mapping Activity Statement shall be submitted in accordance with Appendix M, Subsection M.2.1 of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated February 2002. Appendix M is available for viewing or download on the FEMA Web site at http://www.fema.gov./mit/tsd/frm_gsam.pdf.)
- Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.
- If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR should describe the issue and propose possible resolutions. (For additional information on SPRs, refer to Appendix M, Section M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Additionally, the MCC shall collect and maintain a set of products for all Activities and shall compile a comprehensive TSDN for the entire project.

Table 2-1. Mapping Activities and Applicable TSDN Sections

TSDN Section	Mapping Activities													
	1	2	3	4	5	6	7	8	9	10	11	12, 12A	13	14
General Documentation														
Special Problem Reports	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Telephone Conversation Reports	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Meeting Minutes/Reports	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
General Correspondence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Engineering Analyses														
Hydrologic Analyses	✓			✓	✓	✓	✓	✓	✓					
Hydraulic Analyses	✓			✓	✓	✓	✓	✓	✓					
Key to Cross-Section Labeling	✓			✓	✓	✓	✓	✓	✓					
Key to Transect Labeling	✓			✓	✓	✓	✓	✓	✓					
Draft FIS Report				✓	✓	✓	✓							
Mapping Information		✓						✓	✓	✓	✓	✓	✓	✓
Miscellaneous Reference Information	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

3. Period of Performance*:

The mapping activities outlined in this Mapping Activity Statement will begin on October 1, 2002 and will be completed no later than September 30, 2004. The mapping activities may be terminated at the option of FEMA or CCSD #1 in accordance with the provisions of the Partnership Agreement dated August 29, 2002.

4. Funding/Cost-Sharing:

5. Standards:

Table 5-1 indicates the standards and documentation relevant to this Mapping Activity Statement. Table 5-2 shows the applicable sections of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* for each activity.

* Revised March 14, 2003

6. Schedule*:

The mapping activities outlined in this Mapping Activity Statement shall be completed in accordance with the schedule below. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner.

ACTIVITY	RESPONSIBLE MAPPING PARTNERS	DATE DUE
Activity 1 – Field Surveys and Reconnaissance	CTP	11-15-02
Activity 2 – Topographic Data Development	CTP	12-15-02
Activity 3 – Independent QA/QC Review of Topographic Data	MCC	01-15-03
Activity 4 – Hydrologic Analyses	CTP	03-15-03
Activity 5– Independent QA/QC Review of Hydrologic Analyses	MCC	04-15-03
Activity 6 – Hydraulic Analyses	CTP	06-15-03
Activity 7 – Independent QA/QC Review of Hydraulic Analyses	MCC	07-15-03
Activity 8 – Floodplain Mapping (Detailed Riverine Analysis)	CTP	09-15-03
Activity 9 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	MCC	10-15-03
Activity 10 – Base Map Acquisition and Preparation	CTP	07-15-03
Activity 11 – DFIRM Production (Non-Revised Areas)	MCC	11-15-03
Activity 12 – DFIRM Production (Merging Effective and Revised Information)	MCC	12-15-03
Activity 12A – Application of DFIRM Graphic and Database Specifications	MCC	12-15-03
Activity 13 – Preliminary DFIRM and FIS Report Distribution	MCC	01-15-04
Activity 14 – Post-Preliminary Processing	CTP and MCC	12-15-04

* Revised March 14, 2003

Table 5-1. Applicable Standards for Mapping Activities

	Mapping Activities													
Applicable Standards	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12, 12A**	**13**	**14**
Guidelines and Specifications for Flood Hazard Mapping Partners, February 2002	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
American Congress on Surveying and Mapping procedures	✓	✓	✓											
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-58), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	✓	✓	✓											
U.S. Army Corps of Engineers Engineering Manual No. EM 1000-1-1000, "Photogrammetric Mapping," March 31, 1993	✓	✓	✓											
U.S. Army Corps of Engineers Engineering Manual No. EM 1110-2-1003, "Hydrographic Surveys," October 31, 1994	✓		✓											
Numerical Models Accepted by FEMA for NFIP Usage				✓	✓	✓	✓							
Content Standards for Digital Geospatial Metadata (Federal Geographic Data Committee, 1998)		✓	✓					✓	✓	✓	✓	✓	✓	✓
Document Control Procedures Manual, December 2000													✓	✓

Table 5-2. Mapping Activities and Applicable Sections of FEMA Guidelines and Specifications

Activity Number	Task Description	Applicable Volume, Section/Subsection, and Appendix of *Guidelines and Specifications for Flood Hazard Mapping Partners*
1	Field Surveys and Reconnaissance	Volume 1, Sections 1.2, 1.3, 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.5, A.6, A.7, and A.8 Appendices B, C, and M
2	Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.2 and A.3 Appendix M
3	Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1) Appendix A, Sections A.2, A.3, A.7 (specifically Subsection A.7.5), and A.8 (specifically Subsection A.8.6) Appendix M
4	Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix C, Sections C.1 and C.7 Appendices E, F, G, H, and M
5	Independent QA/QC Review of Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix C, Section C.2 Appendices E, F, G, H, and M
6	Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Sections C.3 and C.7 Appendices B, E, F, G, H, and M

Table 5-2. Mapping Activities and Applicable Sections of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Task Description	Applicable Volume, Section/Subsection, and Appendix of *Guidelines and Specifications for Flood Hazard Mapping Partners*
7	Independent QA/QC Review of Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Section C.5 Appendices B, E, F, G, H, and M
8	Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C. 4 and C.6 Appendices K, L, and M
8B	Floodplain Mapping (Refinement or Creation of Zone A)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices K, L, and M
9	Independent QA/QC Review of Floodplain Mapping	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices D, K, L, and M
10	Base Map Acquisition and Preparation	Volume 1, Sections 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsection 1.4.3) Appendices A and B

Table 5-2. Mapping Activities and Applicable Sections of FEMA Guidelines and Specifications (Cont'd)

Task Number	Task Description	Applicable Volume, Section/Subsection, and Appendix of *Guidelines and Specifications for Flood Hazard Mapping Partners*
11	DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.2) Appendices K, L, and M
12	DFIRM Production (Merging of Revised and Non-Revised Information)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) Appendices K and L
12A	Application of DFIRM Graphic and Database Specifications	Volume 1, Section 1.4 (specifically Subsection 1.4.3) Appendices K and L
13	Preliminary DFIRM and FIS Report Distribution	Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Appendices J, K, L, and M
14	Post-Preliminary Processing	Volume 1, Section 1.5 Appendices J, K, L, and M

7. Certification: The following certifications apply to this Mapping Activity Statement (as appropriate):

Activity 1 (Field Surveys and Reconnaissance) and Activity 2 (Topographic Data Development)

- A Registered Professional Engineer or Licensed Land Surveyor shall certify topographic information, in accordance with 44 CFR 65.5(c). Certification of topographic information by the American Society for Photogrammetry and Remote Sensing is also acceptable.

Activity 4 (Hydrologic Analyses), Activity 6 (Hydraulic Analyses), and Activities 8, 8A, and 8B (Floodplain Mapping)

- Hydrologic and/or hydraulic analyses and data shall be certified by a Registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.6(f).
- Topographic information shall be certified by a Registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.5(c).
- Any levee systems to be accredited shall be certified in accordance with 44 CFR 65.10(e).

Activity 8 (Floodplain Mapping) and Activity 11 (DFIRM Production (Non-Revised Areas))

- The DFIRM metadata files shall include a description of the horizontal and vertical accuracy of the DFIRM base map and floodplain information.

Activity 10 (Base Map Acquisition and Preparation)

- A community official or responsible party shall provide written certification that the digital data meet the FEMA minimum standards and specifications.
- The responsible Mapping Partner shall provide documentation that the digital base map can be used by FEMA.

8. Technical Assistance and Resources:

CCSD #1 may obtain copies of FEMA-issued Letters of Map Change, archived engineering backup data, and data collected as part of the FEMA Mapping Needs Assessment Process from the MCC. The MCC may be contacted by telephone at 703-960-8800 or by facsimile at 703-960-9125. General technical and programmatic information, such as FEMA 265, the Quick-2 computer program, and the MT-2 application/certification forms, can be downloaded from the FEMA Flood Hazard Mapping Web site (www.fema.gov./mit/tsd/). Specific technical and programmatic support may be provided through the MCC; such assistance should be requested through the FEMA MCC Project Officer specified in Section 11 of this Mapping Activity Statement.

CCSD #1 also may consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or subcontractors, and GIS-based engineering and modeling training.

9. Contractors:

CCSD#1 intends to procure the services of PWR for this Flood Map Project. CCSD #1 shall ensure that procurement of PWR and other contractors for work on this Flood Map Project complies with the requirements of 44 CFR 13.36. Part 13 may be downloaded in PDF or text format from the U.S. Government Printing Office Web site at http://www.access.gpo.gov/nara/cfr/waisidx_01/44cfr13_01.html.

10. Financial Reporting*:

Financial reporting will be in accordance with Cooperative Agreement Articles V and VI.

* Revised March 14, 2003

11. Points of Contact:

For this Flood Map Project, the FEMA Regional Project Officer will be Mr. Joe Weber, CFM, the CCSD #1 Project Manager will be Mr. Michael Nacrelli, and the PWR Project Manager will be Mr. Roger C. Sutherland, or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, the assistance of the FEMA MCC should be requested through Michael Grimm, the FEMA MCC Project Officer.

Each party has caused this Mapping Activity Statement to be executed by its duly authorized representative.

Jay Bacon, Interim Director
Water Environment Services of Clackamas County

9-4-02
Date

Joseph Weber, CFM
Regional Project Officer
Federal Emergency Management Agency, Region X

10/09/02
Date

Michael Grimm
Project Officer, Western Studies Team
Federal Emergency Management Agency

10/25/02
Date